

72 The Miracle Fish?



Have you ever thought that it would be cool to have parrots flying around in your backyard? Or wished that there were hippos in your local lake? What happens when you introduce an organism into a new environment?

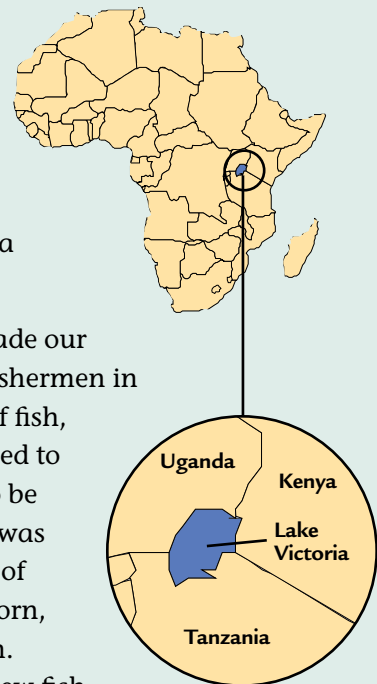
CHALLENGE

What are the trade-offs of introducing a species into a new environment?

Fishing on Lake Victoria

James Abila is a Kenyan boy of 17. His family has a small fishing boat on Lake Victoria. He sat outside his hut to talk to us. Inside, his mother was preparing lunch, while his sister and younger brother were laying out a few fish to dry in the afternoon sun.

James started his story. “My father made our boat. He was always one of the best fishermen in the village. He still catches all kinds of fish, though he says it’s not as easy as it used to be. Most of the fish in the lake used to be very small, just 2–4 inches long. So it was easy to use our net to catch hundreds of small fish. But about the time I was born, the number of fish seemed to go down. Luckily, the government introduced new fish into the lake. Now, the most common fish in the lake is Nile perch. It’s a much bigger fish and can be too heavy to catch with a net. That’s why I work for one of the fishing companies. They have the large boats needed to catch Nile perch. And I can earn money to help feed my family.”



MATERIALS



For each student

- 1 Student Sheet 72.1, "Intra-act: The Miracle Fish?"
- 1 Student Sheet 72.2, "Discussion Web: Should Nile Perch Have Been Introduced?"

PROCEDURE

1. Work with your group to read the story of Nile perch in Lake Victoria.
2. Discuss whether you think Nile perch should have been introduced into Lake Victoria.
3. Use Student Sheet 72.1, "Intra-act: The Miracle Fish?" and have each member of your group take a different perspective from the list below:
 - James
 - James's father
 - An owner of a fishing company
 - An environmentalist
4. From the perspective of your character, mark whether you agree or disagree with the statements on Student Sheet 72.1, "Intra-act Discussion: The Miracle Fish?" Predict what you think other members of your group will say.
5. Discuss the statements with your group.



This man is holding a large Nile perch.

NILE PERCH

Lake Victoria is the second largest lake in the world and it contains some extremely large fish. One type of fish found there, known as Nile perch (*Lates niloticus*), can grow to 240 kilograms (530 pounds), though its average size is 3–6 kilograms (7–13 pounds). But Nile perch weren’t always found in Lake Victoria. Until the 1980s, the most common fish in Lake Victoria were cichlids (SICK-lids), small freshwater fish about 2–4 inches long. (If you’ve ever seen aquarium fish such as oscars, Jack Dempseys, or freshwater angelfish, you’ve seen a cichlid.)

Lake Victoria cichlids interest **ecologists**—scientists who study relationships between organisms and environments—because there are so many species of these fish. Although they all belong to the same family (see Table 1), at one time there were over 300 different species of cichlids in Lake Victoria. Almost 99% of these species could not be found anywhere else in the world!

Table 1: Classification of Cichlids

Kingdom	Animalia
Phylum	Chordata
Class	Osteichthyes (bony fish)
Family	Cichlidae

There used to be many other kinds of fish in the lake, including catfish, carp, and lungfish. The 30 million people who lived around Lake Victoria relied on the lake for food. Because most of the fish were small, they could be caught by using simple fishing nets and a canoe. The fish were then dried in the sun and sold locally.

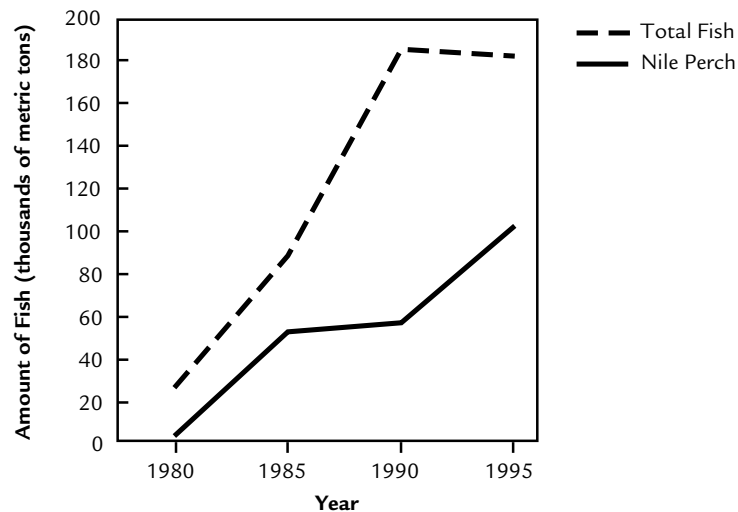
By the late 1950s, however, it appeared the lake was being overfished. So many fish were caught that the populations remaining did not have enough members left to reproduce and grow. If the lake continued to be overfished, there might not be enough fish left for people to eat. As a result, the British government (which ruled this part of Africa at that time) decided to introduce new fish species, such as Nile perch, into the lake. They wanted to increase the amount of fish that was available to eat; they



Cichlids are one of the many small fish commonly found in Lake Victoria.

hoped to provide more high-protein fish for local people and to be able to sell extra fish to other countries. Ecologists were opposed to this idea. They were worried that the introduction of Nile perch, which had no natural enemies within the lake, would negatively affect the lake's ecosystem. Before a final decision could be made, Nile perch were secretly added into the lake. Eventually, more Nile perch were deliberately added by the government in the early 1960s.

During the 1960s and 1970s, before there were a lot of Nile perch in the lake, about 100,000 metric tons of fish (including cichlids) were caught each year. By 1989, the total catch of fish from Lake Victoria had increased to 500,000 metric tons. Today, each of the three countries surrounding the lake (Uganda, Kenya, and Tanzania) sells extra fish to other countries. In the graph below, you can see how the amount of fish caught by Kenyan fisheries has changed over a 15-year period.



AMOUNT OF FISH CAUGHT IN LAKE VICTORIA BY KENYA





Besides increasing the amount of fish, there have been other consequences of introducing Nile perch into the lake. Because Nile perch are large and eat other fish, they are believed to have caused the extinction of as many as 200 species of cichlids. The populations of other types of fish, including catfish and lungfish, have also declined. Many ecologists are upset that their predictions have come true.

Some of the cichlids that have become extinct ate algae. With their extinction, the amount of algae in the lake has increased 5-fold. Algae use up a lot of oxygen, making it difficult for other tiny plants and animals to survive in the lake. Today, many of the deeper parts of the lake are considered “dead” because they don’t contain much living matter.

However, many of the original goals have been met. In 1979, there were 16,000 fishermen along the Kenyan shores of the lake. In 1993, there were 82,300. Many people are now employed by companies that process and sell Nile perch overseas. Over time, these fish have brought more money into the African countries surrounding the lake. Local people, who now eat Nile perch as part of their diet, consider Nile perch a “savior.”

Some ecologists wonder how long the current situation can last. Nile perch are predators. As populations of other fish decline, the Nile perch’s food sources are declining. The stomachs of some large Nile perch have been found to contain smaller, juvenile Nile perch. What will happen to the population of Nile perch if their food supply dwindles even further? Will the Nile perch population be overfished like the fish populations before it? Only time will tell.

ANALYSIS

1. Based on the reading, how did the amount of fish caught in Lake Victoria change from the 1960s to 1989?
2.  Based on the graph showing amounts of fish caught in Lake Victoria, describe how the amount of Nile perch caught by Kenya changed from 1980 to 1995.
3.  Look again at the graph. How do you think the number of metric tons of fish caught relates to the size of the total fish population from year to year? Explain your reasoning.
4. How did the introduction of Nile perch affect the food supply of the people who lived near Lake Victoria?
5. What effect did the introduction of Nile perch have on the organisms that lived in the lake?
6.  Should Nile perch have been introduced into Lake Victoria? Support your answer with evidence and discuss the trade-offs of your decision.
Hint: To write a complete answer, first state your opinion. Provide two or more pieces of evidence that support your opinion. Then consider all sides of the issue and identify the trade-offs of your decision.
7.  What do you predict will happen to Lake Victoria over the next 20–30 years? Why?

EXTENSION



Find current information about the ecology and distribution of the Nile perch and about efforts to manage the perch on the *Issues and Life Science* page of the SEPUP website.